

Appl. No. 10/826534

In the Claims:

Listing of all claims:

1 1. (Previously Presented) A welding type power
2 source capable of receiving a range of input voltages
3 and frequencies, comprising:
4 an input circuit configured to receive an
5 input power signal having an input frequency and an
6 input magnitude and provide a first signal having a
7 magnitude responsive to the input magnitude;
8 a preregulator configured to receive the first
9 signal and provide a dc second signal having a
10 preregulator magnitude independent of the input
11 magnitude;
12 an output circuit configured to receive the dc
13 second signal and provide a welding type output power
14 signal having an output frequency independent of the
15 input frequency and having an output voltage independent
16 of the input voltage;
17 a preregulator controller, connected to the
18 preregulator, having a power factor correction circuit,
19 and further having a controller power input; and
20 a control power circuit configured to receive
21 the dc second signal and provide a control power signal
22 to the controller power input, wherein the controller
23 power signal has a control power magnitude independent
24 of the input magnitude and a control frequency
25 independent of the input frequency.

1 2. (Original) The apparatus of claim 1,
2 wherein the input circuit includes a rectifier.

Appl. No. 10/826534

1 3. (Original) The apparatus of claim 1,
2 wherein the preregulator magnitude is greater than the first
3 magnitude.

1 4. (Original) The apparatus of claim 3,
2 wherein the preregulator includes a boost converter.

1 5. (Original) The apparatus of claim 4,
2 wherein the boost converter includes a slow voltage switched
3 switch and a slow current switched switch.

1 6. (Original) The apparatus of claim 3,
2 wherein the output circuit includes an inverter.

1 7. (Original) The apparatus of claim 3
2 wherein the output circuit includes a switched snubber.

1 8. (Original) The apparatus of claim 3,
2 wherein the preregulator magnitude is greater than the
3 control power magnitude.

1 9. (Original) The apparatus of claim 3
2 wherein the control power circuit includes a buck converter.

10. (Cancelled.)

1 11. (Previously Presented) A method of providing
2 welding type power from a range of input voltages and
3 frequencies, comprising:
4 receiving an input power signal having an
5 input frequency and an input magnitude;
6 providing a first signal having a magnitude
7 responsive to the input magnitude;

Appl. No. 10/826534

8 converting and power factor correcting, by
9 controlling a switch, the first signal into a dc second
10 signal having a second magnitude independent of the
11 input magnitude;
12 providing an output power signal derived from
13 the dc second signal, wherein the output power signal is
14 a welding type output and has an output frequency
15 independent of the input frequency and further has an
16 output voltage independent of the input voltage; and
17 converting the dc second signal into control
18 power, wherein the control power has a control power
19 magnitude independent of the input magnitude.

1 12. (Original) The method of claim 11, wherein
2 providing a first signal includes rectifying an ac signal.

1 13. (Original) The method of claim 11, wherein
2 the second magnitude is greater than the first magnitude.

1 14. (Original) The method of claim 13, wherein
2 converting the first signal into a dc second signal includes
3 boost converting the first signal.

1 15. (Original) The method of claim 13, wherein
2 boost converting the first signal includes a slow voltage
3 switching and slow current switching a switch.

1 16. (Original) The method of claim 13, wherein
2 providing an output power signal includes inverting the dc
3 second signal.

1 17. (Original) The method of claim 13 wherein
2 inverting the dc second signal includes switching a snubber.

Appl. No. 10/826534

1 18. (Original) The method of claim 13, wherein
2 the second magnitude is greater than the control power
3 magnitude.

1 19. (Original) The method of claim 13 wherein
2 converting the dc second signal into control power includes
3 buck converting the dc second signal.

20. (Cancelled.)

1 21. (Previously Presented) A welding type power
2 source capable of receiving a range of input voltages
3 and frequencies, comprising:

4 input means for receiving an input power
5 signal having an input frequency and an input magnitude
6 and for providing a first signal having a magnitude
7 responsive to the input magnitude;

8 converting means for converting, and power
9 factor correcting by controlling a switch, the first
10 signal into a dc second signal having a magnitude
11 independent of the input magnitude, wherein the
12 converting means is connected to receive the first
13 signal;

14 means for providing a welding type output
15 power signal derived from the dc second signal, wherein
16 the output power signal and has an output frequency
17 independent of the input frequency and further has an
18 output voltage independent of the input voltage, and
19 wherein the means for providing an output power signal
20 is disposed to receive the dc second signal;

Appl. No. 10/826534

21 means for converting the dc second signal into
22 control power, wherein the control power has a control
23 power magnitude independent of the input magnitude.

1 22. (Original) The apparatus of claim 21,
2 wherein the first means includes means for rectifying an ac
3 signal.

1 23. (Original) The apparatus of claim 22,
2 wherein the convertor magnitude is greater than the first
3 magnitude.

1 24. (Original) The apparatus of claim 23,
2 wherein the converting means includes means for boost
3 converting the first signal.

1 25. (Original) The apparatus of claim 24,
2 wherein the means for boost converting includes means for
3 slow voltage switching and slow current switching a switch.

1 26. (Original) The apparatus of claim 25,
2 wherein the means for providing an output power signal
3 includes means for inverting the dc second signal.

1 27. (Original) The apparatus of claim 26
2 wherein the means for inverting includes means for switching
3 a snubber.

1 28. (Original) The apparatus of claim 27,
2 wherein the converter magnitude is greater than the control
3 power magnitude.

Appl. No. 10/826534

1 29. (Original) The apparatus of claim 28
2 wherein the means for converting the dc second signal into
3 control power includes means for buck converting the dc
4 second signal.

1 30. (Previously Presented) A welding type power
2 source capable of receiving a range of input voltages
3 and frequencies, comprising:
4 a dc bus;
5 an output circuit configured, having a control
6 input and to receive the dc bus and provide a welding
7 type output power signal having an output frequency
8 independent of the input frequency and having an output
9 voltage independent of the input voltage;
10 a controller, including a power factor
11 correction circuit, connected to the control input and
12 further having a controller power input; and
13 a control power circuit configured to receive
14 the dc bus and provide a control power signal to the
15 controller power input.

1 31. (Original) The apparatus of claim 30,
2 wherein the output circuit includes an inverter.

1 32. (Original) The apparatus of claim 31,
2 wherein the output circuit includes a switched snubber.

1 33. (Original) The apparatus of claim 30,
2 wherein the dc bus has a magnitude is greater than a
3 magnitude of the control power signal.

1 34. (Original) The apparatus of claim 30
2 wherein the control power circuit includes a buck converter.

Appl. No. 10/826534

35-36. (Cancelled.)

1 37. (Previously Presented) A welding type
2 power source capable of receiving a range of input
3 voltages and frequencies, comprising:
4 an input circuit configured to receive an
5 input power signal having an input frequency and an
6 input magnitude and provide a first signal having a
7 magnitude responsive to the input magnitude;
8 a preregulator configured to receive the first
9 signal and provide a dc second signal having a
10 preregulator magnitude independent of the input
11 magnitude;
12 an output circuit configured to receive the dc
13 second signal and provide a welding type output power
14 signal having an output frequency independent of the
15 input frequency and having an output voltage independent
16 of the input voltage;
17 a preregulator controller, connected to the
18 preregulator, and further having a controller power
19 input; and
20 a control power circuit configured to receive
21 the dc second signal and provide a control power signal
22 to the controller power input, wherein the controller
23 power signal has a control power magnitude independent
24 of the input magnitude and a control frequency
25 independent of the input frequency, without
26 reconfiguring the control power circuit.

1 38. (Previously Presented) The apparatus of
2 claim 37, wherein the input circuit includes a rectifier.

Appl. No. 10/826534

1 39. (Previously Presented) The apparatus of
2 claim 37, wherein the preregulator magnitude is greater than
3 the first magnitude.

1 40. (Previously Presented) The apparatus of
2 claim 39, wherein the preregulator includes a boost
3 converter.

1 41. (Previously Presented) The apparatus of
2 claim 40, wherein the boost converter includes a slow voltage
3 switched switch and a slow current switched switch.

1 42. (Previously Presented) The apparatus of
2 claim 39, wherein the output circuit includes an inverter.

1 43. (Previously Presented) The apparatus of
2 claim 39 wherein the output circuit includes a switched
3 snubber.

1 44. (Previously Presented) The apparatus of
2 claim 39, wherein the preregulator magnitude is greater than
3 the control power magnitude.

1 45. (Previously Presented) The apparatus of
2 claim 39 wherein the control power circuit includes a buck
3 converter.

1 46. (Previously Presented) A method of providing
2 welding type power from a range of input voltages and
3 frequencies, comprising:
4 receiving an input power signal having an
5 input frequency and an input magnitude;

Appl. No. 10/826534

6 providing a first signal having a magnitude
7 responsive to the input magnitude;
8 converting the first signal into a dc second
9 signal having a second magnitude independent of the
10 input magnitude;
11 providing an output power signal derived from
12 the dc second signal, wherein the output power signal is
13 a welding type output and has an output frequency
14 independent of the input frequency and further has an
15 output voltage independent of the input voltage; and
16 converting the dc second signal into control
17 power, without reconfiguring a control power circuit,
18 wherein the control power has a control power magnitude
19 independent of the input magnitude.

1 47. (Previously Presented) The method of claim
2 46, wherein providing a first signal includes rectifying an
3 ac signal.

1 48. (Previously Presented) The method of claim
2 46, wherein the second magnitude is greater than the first
3 magnitude.

1 49. (Previously Presented) The method of claim
2 48, wherein converting the first signal into a dc second
3 signal includes boost converting the first signal.

1 50. (Previously Presented) The method of claim
2 48, wherein boost converting the first signal includes a slow
3 voltage switching and slow current switching a switch.

Appl. No. 10/826534

1 51. (Previously Presented) The method of claim
2 48, wherein providing an output power signal includes
3 inverting the dc second signal.

1 52. (Previously Presented) The method of claim
2 48, wherein inverting the dc second signal includes switching
3 a snubber.

1 53. (Previously Presented) The method of claim
2 48, wherein the second magnitude is greater than the control
3 power magnitude.

1 54. (Previously Presented) The method of claim
2 48, wherein converting the dc second signal into control
3 power includes buck converting the dc second signal.

1 55. (Previously Presented) A welding type power
2 source capable of receiving a range of input voltages
3 and frequencies, comprising:

4 input means for receiving an input power
5 signal having an input frequency and an input magnitude
6 and for providing a first signal having a magnitude
7 responsive to the input magnitude;

8 converting means for converting the first
9 signal into a dc second signal having a magnitude
10 independent of the input magnitude, wherein the
11 converting means is connected to receive the first
12 signal;

13 means for providing a welding type output
14 power signal derived from the dc second signal, wherein
15 the output power signal and has an output frequency
16 independent of the input frequency and further has an
17 output voltage independent of the input voltage, and

Appl. No. 10/826534

18 wherein the means for providing an output power signal
19 is disposed to receive the dc second signal;
20 means for converting the dc second signal into
21 control power, without reconfiguring, wherein the
22 control power has a control power magnitude independent
23 of the input magnitude.

1 56. (Previously Presented) The apparatus of
2 claim 55, wherein the first means includes means for
3 rectifying an ac signal.

1 57. (Previously Presented) The apparatus of
2 claim 56, wherein the convertor magnitude is greater than the
3 first magnitude.

1 58. (Previously Presented) The apparatus of
2 claim 57, wherein the converting means includes means for
3 boost converting the first signal.

1 59. (Previously Presented) The apparatus of
2 claim 58, wherein the means for boost converting includes
3 means for slow voltage switching and slow current switching a
4 switch.

1 60. (Previously Presented) The apparatus of
2 claim 59, wherein the means for providing an output power
3 signal includes means for inverting the dc second signal.

1 61. (Previously Presented) The apparatus of
2 claim 60, wherein the means for inverting includes means for
3 switching a snubber.

Appl. No. 10/826534

1 62. (Previously Presented) The apparatus of
2 claim 61, wherein the converter magnitude is greater than the
3 control power magnitude.

1 63. (Previously Presented) The apparatus of
2 claim 62 wherein the means for converting the dc second
3 signal into control power includes means for buck converting
4 the dc second signal.

1 64. (Previously Presented) A welding type power
2 source capable of receiving a range of input voltages
3 and frequencies, comprising:
4 an input circuit configured to receive an
5 input power signal having an input frequency and an
6 input magnitude and provide a first signal having a
7 magnitude responsive to the input magnitude;
8 a preregulator configured to receive the first
9 signal and provide a dc second signal having a
10 preregulator magnitude independent of the input
11 magnitude;
12 an output circuit configured to receive the dc
13 second signal and provide a welding type output power
14 signal having an output frequency independent of the
15 input frequency and having an output voltage independent
16 of the input voltage;
17 a preregulator controller, connected to the
18 preregulator, and further having a controller power
19 input;
20 a control power circuit configured to receive
21 the dc second signal and provide a control power signal
22 to the controller power input, wherein the controller
23 power signal has a control power magnitude independent

Appl. No. 10/826534

24 of the input magnitude and a control frequency
25 independent of the input frequency; and
26 an aux power circuit configured to receive the
27 dc second signal and provide a synthetic AC aux signal
28 having magnitude independent of the input magnitude and
29 a frequency independent of the input frequency.

1 65. (Previously Presented) The apparatus of
2 claim 64, wherein the input circuit includes a rectifier.

1 66. (Previously Presented) The apparatus of
2 claim 64, wherein the preregulator magnitude is greater than
3 the first magnitude.

1 67. (Previously Presented) The apparatus of
2 claim 66, wherein the preregulator includes a boost
3 converter.

1 68. (Previously Presented) The apparatus of
2 claim 67, wherein the boost converter includes a slow voltage
3 switched switch and a slow current switched switch.

1 69. (Previously Presented) The apparatus of
2 claim 67, wherein the output circuit includes an inverter.

1 70. (Previously Presented) The apparatus of
2 claim 67, wherein the output circuit includes a switched
3 snubber.

1 71. (Previously Presented) The apparatus of
2 claim 66, wherein the preregulator magnitude is greater than
3 the control power magnitude.

Appl. No. 10/826534

1 72. (Previously Presented) The apparatus of
2 claim 66 wherein the control power circuit includes a buck
1 converter.

1 73. (Previously Presented) A method of providing
2 welding type power from a range of input voltages and
3 frequencies, comprising:

4 receiving an input power signal having an
5 input frequency and an input magnitude;

6 providing a first signal having a magnitude
7 responsive to the input magnitude;

8 converting the first signal into a dc second
9 signal having a second magnitude independent of the
10 input magnitude;

11 providing an output power signal derived from
12 the dc second signal, wherein the output power signal is
13 a welding type output and has an output frequency
14 independent of the input frequency and further has an
15 output voltage independent of the input voltage;

16 converting the dc second signal into control
17 power, wherein the control power has a control power
18 magnitude independent of the input magnitude; and

19 inverting the dc second signal into synthetic
20 AC aux power, wherein the aux power has a control power
21 magnitude independent of the input magnitude.

1 74. (Previously Presented) The method of claim
2 73, wherein providing a first signal includes rectifying an
3 ac signal.

1 75. (Previously Presented) The method of claim
2 73, wherein the second magnitude is greater than the first
3 magnitude.

Appl. No. 10/826534

1 76. (Previously Presented) The method of claim
2 75, wherein converting the first signal into a dc second
3 signal includes boost converting the first signal.

1 77. (Previously Presented) The method of claim
2 75, wherein boost converting the first signal includes a slow
3 voltage switching and slow current switching a switch.

1 78. (Previously Presented) The method of claim
2 75, wherein providing an output power signal includes
3 inverting the dc second signal.

1 79. (Previously Presented) The method of claim
2 75, wherein inverting the dc second signal includes switching
3 a snubber.

1 80. (Previously Presented) The method of claim
2 75, wherein the second magnitude is greater than the control
3 power magnitude.

1 81. (Previously Presented) The method of claim
2 75, wherein converting the dc second signal into control
3 power includes buck converting the dc second signal.

1 82. (Previously Presented) A method of providing
2 welding type power from a range of input voltages and
3 frequencies, comprising:
4 rectifying an input power signal having an
5 input frequency and an input magnitude to provide a
6 rectified signal having a rectified magnitude responsive
7 to the input magnitude;

Appl. No. 10/826534

8 boost converting, including slow voltage
9 switching and slow current switching, the rectified
10 signal to provide a boost dc signal having a boost
11 magnitude greater than and independent of the rectified
12 input magnitude;

13 inverting, including switching a snubber, the
14 dc second signal to provide a welding type power output
15 having an output frequency independent of the input
16 frequency and having an output voltage independent of
17 the rectified magnitude;

18 converting the boost dc signal to provide a
19 control power signal, wherein the control power signal
20 has a control power magnitude less than and independent
21 of the boost magnitude, and a control frequency
22 independent of the input frequency; and

23 inverting the boost dc signal to provide a
24 synthetic AC aux power signal, wherein the aux power
25 signal has a magnitude less than and independent of the
26 boost magnitude, and a frequency independent of the
27 input frequency.

1 83. (Previously Presented) A welding type power
2 source capable of receiving a range of input voltages
3 and frequencies, comprising:

4 input means for receiving an input power
5 signal having an input frequency and an input magnitude
6 and for providing a first signal having a magnitude
7 responsive to the input magnitude;

8 converting means for converting the first
9 signal into a dc second signal having a magnitude
10 independent of the input magnitude, wherein the
11 converting means is connected to receive the first
12 signal;

Appl. No. 10/826534

13 means for providing a welding type output
14 power signal derived from the dc second signal, wherein
15 the output power signal and has an output frequency
16 independent of the input frequency and further has an
17 output voltage independent of the input voltage, and
18 wherein the means for providing an output power signal
19 is disposed to receive the dc second signal;
20 means for converting the dc second signal into
21 control power, wherein the control power has a control
22 power magnitude independent of the input magnitude; and
23 means for inverting the dc second signal into
24 synthetic AC aux power, wherein the aux power has a
25 control power magnitude independent of the input
26 magnitude.

1 84. (Previously Presented) The apparatus of
2 claim 83, wherein the first means includes means for
3 rectifying an ac signal.

1 85. (Previously Presented) The apparatus of
2 claim 84, wherein the convertor magnitude is greater than the
3 first magnitude.

1 86. (Previously Presented) The apparatus of
2 claim 85, wherein the converting means includes means for
3 boost converting the first signal.

1 87. (Currently Amended) The apparatus of claim 83
2 ~~80~~, wherein the means for boost converting includes means for
3 slow voltage switching and slow current switching a switch.

Appl. No. 10/826534

1 88. (Previously Presented) The apparatus of
2 claim 87, wherein the means for providing an output power
3 signal includes means for inverting the dc second signal.

1 89. (Previously Presented) The apparatus of
2 claim 88 wherein the means for inverting includes means for
3 switching a snubber.

1 90. (Previously Presented) The apparatus of
2 claim 89, wherein the converter magnitude is greater than the
3 control power magnitude.

1 91. (Previously Presented) The apparatus of
2 claim 90, wherein the means for converting the dc second
3 signal into control power includes means for buck converting
4 the dc second signal.

1 92. (Previously Presented) A welding type power
2 source capable of receiving a range of input voltages
3 and frequencies, comprising:
4 a dc bus;
5 an output circuit configured, having a control
6 input and to receive the dc bus and provide a welding
7 type output power signal having an output frequency
8 independent of the input frequency and having an output
9 voltage independent of the input voltage;
10 a controller, connected to the control input
11 and further having a controller power input;
12 a control power circuit configured to receive
13 the dc bus and provide a control power signal to the
14 controller power input; and
15 an aux power circuit configured to invert the
16 dc bus and provide synthetic AC aux power signal.

Appl. No. 10/826534

1 93. (Previously Presented) The apparatus of
2 claim 92, wherein the output circuit includes an inverter.

1 94. (Previously Presented) The apparatus of
2 claim 93, wherein the output circuit includes a switched
3 snubber.

1 95. (Previously Presented) The apparatus of
2 claim 92, wherein the dc bus has a magnitude is greater than
3 a magnitude of the control power signal.

1 96. (Previously Presented) The apparatus of
2 claim 92 wherein the control power circuit includes a buck
3 converter.

1 97. (Previously Presented) A method of providing
2 welding type power from a range of input voltages and
3 frequencies, comprising:
4 receiving a dc bus having a dc magnitude;
5 providing an output power signal derived from
6 the dc bus, wherein the output power signal is a welding
7 type output; and
8 converting the dc bus into control power,
9 wherein the control power has a control power magnitude
10 independent of the dc magnitude;
11 providing the control power to a controller
12 configured to control the output power; and
13 inverting the dc bus into synthetic AC aux
14 power.

Appl. No. 10/826534

1 98. (Previously Presented) A method of starting
2 to provide welding type power from a range of input
3 voltages and frequencies, comprising:
4 receiving an input power signal having an
5 input frequency and an input magnitude;
6 providing a first dc signal having a first dc
7 magnitude responsive to the input magnitude;
8 deriving a second dc voltage having a second
9 dc magnitude less than the first dc magnitude;
10 controlling a control converter with the
11 second dc voltage to produce a control dc voltage;
12 controlling an output converter with the
13 control dc voltage to produce an output signal; and
14 inverting the second dc voltage to produce a
15 synthetic AC aux signal.